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ABSTRACT

The United States Employment Service (USES) Specific Aptitude Test Battery (SATB) for Carpenter is evaluated from three points of view: (1) technical adequacy of the research; (2) fairness to minorities; and (3) usefulness of the battery to United States Employment Service staff and employers in selecting individuals for Carpenter positions. Research demonstrated a statistically significant and useful relationship between proficiency as a Carpenter and the SATB. The SATB can be expected to produce a useful increase in the proportion of highly proficient workers. When the SATB was applied to the validation sample, composed of individuals who were employed and therefore considered competent, an increase from 66 percent to 82 percent in the proportion of highly proficient workers was found. Similar results were found for the cross-validation sample. A greater increase can be expected when the battery is used with applicants, because the range of relevant abilities is wider among applicants than among employed workers. The report includes: (1) research summary; (2) procedure; (3) analysis; and (4) validity of the battery. Descriptive statistics for subgroups of the validation sample; descriptive rating scale; and job description are contained in the appendices. (Author/PN)

Carpenter (const.)
860.381-022

Development of USES Specific Aptitude Test Battery S-11R82

U.S. Department of Labor
Employment and Training Administration
U.S. Employment Service
1982

DEVELOPMENT OF USES SPECIFIC APTITUDE TEST BATTERY

for

CARPENTER (const.) 860.381-022

S-1-1R82

Developed in cooperation with the California, Colorado, Florida, Illinois, Kansas, Louisiana, Massachusetts, Michigan, New Jersey, and New York Employment Services

Analysis and Report

by

Western Test Development Field Center
Salt Lake City, Utah

U.S. DEPARTMENT OF LABOR

Employment and Training Administration
United States Employment Service

1982

ACKNOWLEDGMENT

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North

Tri-Counties Carpenters Union, Belleville, Illinois
Rockford Area Carpenters, Joint Apprenticeship and Training Committee, Rockford, Illinois
Carpenters Union Local #201, Wichita, Kansas
Carpenters District Council of Madison County and Vicinity Granite City, Illinois
Boston Carpenters Apprenticeship Training Center, Allston, Massachusetts
Associated General Contractors of America (Detroit Chapter, Inc.), Detroit, Michigan
Washtenaw County Construction Industry Affirmative Action Program, Ann Arbor, Michigan
Carpenters Apprentice School, Ferndale, Michigan
Bethlehem Steel Corp., Hoboken, New Jersey
Carpenters Union Local #453, Auburn, New York
United Brotherhood of Carpenters and Joiners of America, Local #66, Olean, New York
Carpenters Union Local #964, Stony Point, New York

South

ITT Rayonier, Inc., Fernandina Beach, Florida
Associated Builders Contractors, Gretna, Louisiana

West

Joint Apprenticeship Committee Fund for Southern California, Los Angeles, California.
Denver Public Schools, Denver, Colorado
Adolph Coors Company, Golden, Colorado

TABLE OF CONTENTS

GATB Study No. 3069

DEVELOPMENT OF USES SPECIFIC APTITUDE TEST BATTERY S-11R82

for

CARPENTER (const.) 860.381-022

RESEARCH SUMMARY

This report is designed to provide the information required to evaluate the Specific Aptitude Test Battery (SATB) for Carpenter from three points of view: (1) technical adequacy of the research; (2) fairness to minorities; and (3) usefulness of the battery to Employment Service staff and employers in selecting individuals for Carpenter positions.

Research demonstrated a statistically significant and useful relationship between proficiency as a Carpenter and the following Specific Aptitude Test Battery:

Aptitudes	Cutting Scores
G - General Learning Ability	85
N - Numerical Aptitude	90
S - Spatial Aptitude	80
P - Form Perception	85

Two samples were used in the research. The validation sample, on which the SATB was developed, consisted of 154 employed workers (including 45 blacks) from 10 states. Data were collected during 1973-80. The tests used were those of the General Aptitude Test Battery (GATB). Job proficiency was measured by supervisory ratings.

A second sample confirmed or cross-validated the SATB. This sample consisted of 119 Carpenter apprentices. The same experimental tests were used. The measure of proficiency was determined from a combination of classroom grades and work ratings. The data were collected in 1951.

Test research analysts found no evidence of difference in validity between blacks and nonminorities; the battery proved to be fair to blacks and nonminorities using several definitions of fairness. Additional information is presented in the Validity of the Battery section and in Appendix 1.

The SATB can be expected to produce a useful increase in the proportion of highly proficient workers. When the SATB was applied to the validation sample, composed of individuals who were employed and therefore considered competent, an increase from 66% to 82% in the proportion of highly proficient workers was found. Similar results were found for the cross-validation sample. A greater increase can be expected when the battery is used with applicants, because the range of relevant abilities is wider among applicants than among employed workers.

PROCEDURE

A concurrent design was used for the validation study; test and criterion data were collected at about the same time at each of the separate employment sites over a period from 1973 to 1980.

Job Analysis

A job analysis was done by observing the workers' performance on the job and by consulting with supervisors. Analysts prepared a job description based on the job analysis. This description was used to select an experimental sample of employed Carpenters and to choose an appropriate criterion or measure of job performance.

Job duties of workers at each location listed in the ACKNOWLEDGMENT section were compared with the job description and found to be essentially the same. If minor differences were found, the job description was modified. The job description shown in Appendix 3 is the result of this process and may be used to provide information on the applicability of the test battery resulting from this research.

Each job duty was rated for frequency of performance, percentage of time spent, and level of difficulty. Critical job duties were identified on the basis of these ratings.

At least one analyst at each location rated the aptitudes as irrelevant, important, or critical to performance of the job duties at that location. A synthesis of these ratings and their rationale follows:

N - Numerical Aptitude	Required in making calculations to meet layout specifications, and to determine quantities and cost of materials needed.
S - Spatial Aptitude	Required in visualizing completed work from blueprints, and in fitting component materials together properly.
P - Form Perception	Required to detect subtle differences in shapes and dimensions of materials before and after they are cut or shaped, and to assemble component pieces into their proper structures or fixtures.
M - Manual Dexterity	Required to manipulate and control hand and power tools used in cutting, shaping, and fastening building materials.

Experimental Test Battery

The experimental test battery for the validation sample consisted of all 12 tests of the GATB, B-1002B. Information on the composition and developmental research of the GATB may be found in the Manual for the General Aptitude Test Battery, Section III, Development, available from the Government Printing Office.

Validation Sample Description

The validation sample consisted of 154 Carpenters employed at various locations in the North, South, and West (see ACKNOWLEDGMENT). A total of 63 were minority group members (45 blacks, 11 Spanish Surnamed, 2 American Indians, and 5 other) and 91 were nonminority group members. None of the 154 subjects were female.

The means and standard deviations for age, education, and experience of sample members are shown in Table 1.

Some sample members were test selected by a numerical ability test. However, the range of GATB numeric aptitude scores for these subjects was not restricted at any location. All workers had at least 24 months' experience on a job which has duties similar to those found in the job description in Appendix 3. Descriptive statistics for black and nonminority subgroups are shown in Appendix 1.

Criterion for Validation Study

The criterion for the validation sample consisted of supervisory ratings. Each subject was rated twice by a first line supervisor with an interval of two weeks between ratings, or once each by a first and second line supervisor. Since sample members' aptitude scores are confidential, supervisors had no knowledge of test scores of workers. Thus, the possibility of these scores affecting ratings did not exist.

A descriptive rating scale was used. The scale (see Appendix 2) consists of six items. Five of these items cover different aspects of job performance. The sixth is a global item on the "all-around" ability of a Carpenter. Each item has five alternative responses corresponding to different degrees of job proficiency. For the purpose of scoring items, weights of 1 to 5 were assigned to the responses. The total score on the rating scale is the sum of the weights for the six items. The possible range for each rating is 6-30.

A review of the job description indicated that the subjects covered by the rating scale were directly related to important aspects of job performance.

A - Quantity of work: A Carpenter must work quickly and efficiently to meet construction deadlines and to coordinate scheduling with other craftsmen involved in building fabrication.

B - Quality of work: The work of a Carpenter must be of high quality to insure that structures and fixtures he helps to construct meet exacting safety and quality specifications.

C - Accuracy of work: A Carpenter must meet close tolerances in cutting, shaping and fitting building materials and in verifying trueness of structures and fixtures.

D - Job knowledge: A Carpenter must be knowledgeable about building materials, up-to-date building procedures, building codes, building tools, equipment and building costs, and must also possess technical knowledge in such areas as blueprint reading and applied geometry.

E - Job versatility: A Carpenter must be capable of executing complex building procedures with a variety of tools and equipment following varying designs and specifications and must be aware of constantly evolving and changing methods.

F - "All-around" job ability: Value to the employer involves a combination of the aspects of job performance listed above.

A reliability coefficient of .84 was obtained between the two different job performance ratings, indicating a significant relationship. Therefore, the final job performance criterion consists of the combined scores of the two ratings. The possible range for the combined scores is 12-60. The actual range for the total sample is 23-60. The mean is 41.4 with a standard deviation of 7.9. Table 1 shows the relationship between the job performance criterion and age, education and experience.

TABLE 1

Means, Standard Deviations (SD), and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

Validation Sample

N = 154

	Mean	SD	r
Age (years)	27.2	4.9	-.06
Education (years)	12.3	1.5	.11
Total Experience (months)	63.8	41.0	.27**

**Significant at the .01 level

For the purpose of analysis, researchers dichotomized the criterion distribution so as to include, as nearly as possible, one-third of the subjects in the low criterion group and two-thirds in the high criterion group. This procedure is the standard for SATB studies. A criterion cutting score of 38 placed 34% of the overall sample in the low criterion group and 66% in the high criterion group.

Cross-Validation Sample Description

The cross-validation sample consisted of 119 male apprentices in Wisconsin and the District of Columbia. This study was conducted prior to the requirement of providing minority group information. Therefore, minority group status of the sample members is unknown. The means, standard deviations and correlations with performance ratings for age, education and experience of sample members are shown in Table 1a.

Criterion for Cross-Validation Study

The criterion for this study consisted of a combination of school grades and supervisory ratings. The criterion for the Wisconsin sample consisted of school grades that each apprentice received at the end of the school year. The grades ranged from 65 to 100 with 70 as the minimum passing grade. The criterion for the Washington, D. C. sample consisted of a rating by the Director of the Joint Carpenter Apprenticeship Committee based on school grades and job reports received. For computational purposes criterion scores for the separate locations were recoded to reflect each subject's status in the high or low criterion group on a common scale. Scores of 2 or 1 were used for high or low groups respectively.

TABLE 1a

Means, Standard Deviations (SD), and Rearson Product-Moment Correlations with the Criterion (r) for Age and Education

Cross-Validation Sample

N = 119

	Mean	SD	r
Age (years)	22.2	4.2	.442**
Education (years)	10.9	1.9	.311**

**Significant at the .01 level

ANALYSIS

The initial step in SATB data analysis is to identify those aptitudes which show some evidence of validity and job relatedness. This evidence can be:

1. Statistical evidence of the correlation (r) between the test and the criterion,

2. Content validity as evidenced by a rating of "critical" based on the job analysis, or

3. Any combination of the following:

   - high mean

   - low standard deviation (SD)

   - rating of "important" based on the job analysis

   - demonstrated validity in a prior validation study.

Statistical results for the validation sample are shown in Table 2.

TABLE 2

Statistical Results for Validation Sample

N = 154

Aptitude	Mean	SD	r
G - General Learning Ability	100.0	16.4	.42**
V - Verbal Ability	93.2	13.9	.29**
N - Numerical Aptitude	96.9	16.6	.39**
S - Spatial Aptitude	111.4	19.7	.38**
P - Form Perception	111.8	19.6	.31**
Q - Clerical Perception	108.6	14.8	.35**
K - Motor Coordination	103.2	16.1	.14
F - Finger Dexterity	98.7	17.6	.07
M - Manual Dexterity	113.0	20.8	-.07

**Significant at the .01 level

Table 3 summarizes the qualitative analysis and statistical results shown in Table 2 and shows the aptitudes considered for inclusion in the SATB.

TABLE 3

Summary of Qualitative and Quantitative Data for Validation Sample

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Ratings									
Critical									
Important			X	X	X				X
Irrelevant									
Statistical Evidence									
High Mean				X	X				X
Low SD		X				X			
Significant r	X	X	X	X	X	X			
Aptitudes Considered for Inclusion in the Battery	G	V	N	S	P	Q			M

The information in Table 3 indicates the following aptitudes should be considered for inclusion in the battery: G, V, N, S, P, Q and M. The objective is to develop a battery of 2, 3 or 4 aptitudes with cutting scores at the point (a) where about the same percent will meet the cutting scores as the percent rated in the high criterion group, and (b) which will maximize the relationship between the battery and the criterion.

The cutting scores are set at about one standard deviation below the mean aptitude scores of the sample, with deviations of five point intervals above and below these points to achieve the objectives stated above.

The following battery resulted:

Aptitudes	Cutting Scores
G - General Learning Ability	85
N - Numerical Aptitude	90
S - Spatial Aptitude	80
P - Form Perception	85

Although Aptitude G was not considered important by most analysts, further analysis reveals no contraindication between this aptitude and performance requirements.

VALIDITY OF THE BATTERY

This section of the report first presents evidence of criterion-related validity of the SATB on the validation sample and all relevant subsamples. Next, it provides information on effectiveness and fairness of test norms.

Criterion Related Validity

Table 4 shows that there is a significant relationship between the job performance criterion and the SATB for the validation sample in aggregate, each of its identifiable ethnic subgroups, and the cross-validation sample.

TABLE 4

Validity of Battery

Sample	N	High Criterion Group: Below Cutting Scores	High Criterion Group: Meeting Cutting Scores	Low Criterion Group: Below Cutting Scores	Low Criterion Group: Meeting Cutting Scores	Chi Square	Significance Level P/2 <	Phi Coefficient
Total	154	24	77	36	17	28.5	.0005	.43
Black	45	8	3	24	5	3.9*	.03**	.29
Non-minority	91	11	60	11	9	11.2*	.001**	.35
Cross-Validation Sample	119	29	61	22	7	17.1	.0005	.38

*Yates' corrected
**Computed using Fisher's exact probability test

As a further test of battery validity, analysts computed a multiple correlation coefficient for the total validation sample. An R of .45 (significant at the .05 level) was obtained between the job performance criterion and Aptitudes G, N, S and P.

Effectiveness of the Battery

The level of validity shown in Table 4 indicates that the SATB will be useful in selection. In the total validation sample 66% were considered to be highly proficient. Of those who met the cutting scores, 82% were judged to be highly proficient, an increase of 16 percentage points over the existing selection method. These findings are shown in Table 5.

TABLE 5

Effectiveness of Battery

Selection System	Number Selected	Highly Proficient (High Criterion Group)		Marginal (Low Criterion Group)	
		N	% of Total	N	% of Total
Validation Sample					
Without Tests	154	101	66	53	34
With Tests	94	77	82	17	18
Cross Validation Sample					
Without Tests	119	90	76	29	24
With Tests	68	61	90	7	10

The research sample consisted of employed workers on whom some selection had already taken place; presumably those workers who lacked the required abilities had quit, been terminated, or had been transferred. Therefore, a greater increase over existing selection methods in the proportion of highly proficient workers selected is to be expected when the battery is used for selection, as the range of relevant abilities is almost certainly greater among applicants than among employed workers.

Subgroup Analysis

No difference in the validities for blacks and nonminorities was found for this battery; the difference between the phi coefficients for blacks and nonminorities is not statistically significant (CR = -.34).

The battery is fair to blacks since the proportion of both blacks and nonminorities that met the cutting scores approximated the proportion who were in the high criterion group; 29% of the blacks met the cutting scores and 36% were in the high criterion group; 76% of the nonminorities met the cutting scores and 78% were in the high criterion group.

Prior Battery

Analysts tested previously validated norms for Carpenter S-11R on this revalidation sample. The original battery, validated in June 1970, is N-80, S-85, K-70 and M-80. This battery is valid for the total revalidation sample, phi = .30 (significant at .01 level).

APPENDIX 1

Descriptive Statistics for Black and Nonminority Subgroups of Validation Sample

Variable	Black N = 45 Mean	SD	Range	Nonminority N = 91 Mean	SD	Range
Aptitude G	87.3	11.8	63-117	105.7	15.1	67-144
Aptitude V	84.9	10.0	65-111	97.0	14.0	65-143
Aptitude N	85.0	13.8	55-117	102.7	14.6	58-138
Aptitude S	97.9	18.4	65-153	116.4	18.2	74-163
Aptitude P	100.4	17.3	53-136	115.3	19.2	70-166
Aptitude Q	100.7	15.0	57-148	111.2	13.7	81-171
Aptitude K	99.6	18.9	45-140	104.1	14.7	66-142
Aptitude F	95.4	16.1	58-132	99.7	18.1	54-150
Aptitude M	114.8	24.6	59-169	112.6	19.8	76-158
Criterion	36.0	7.9	23-060	43.1	6.8	25-056
Age	27.9	4.9	18-039	27.3	4.9	20-038
Education	11.8	1.1	9-015	12.5	1.7	6-016
Total Experience (months)	56.0	28.6	28-156	68.2	44.8	24-228

APPENDIX 2

U.S. DEPARTMENT OF LABOR • MANPOWER ADMINISTRATION

DESCRIPTIVE RATING SCALE

SCORE _____

RATING SCALE FOR _____

D.O.T. Title and Code

Directions: Please read the "Suggestions to Raters" and then fill in the items which follow. In making your ratings, only one box should be checked for each question.

SUGGESTIONS TO RATERS

We are asking you to rate the job performance of the people who work for you. These ratings will serve as a "yardstick" against which we can compare the test scores in this study. The ratings must give a true picture of each worker or this study will have very little value. You should try to give the most accurate ratings possible for each worker.

These ratings are strictly confidential and won't affect your workers in any way. Neither the ratings nor test scores of any workers will be shown to anybody in your company. We are interested only in "testing the tests." Ratings are needed only for those workers who are in the test study.

Workers who have not completed their training period, or who have not been on the job or under your supervision long enough for you to know how well they can perform this work should not be rated. Please inform the test technician about this if you are asked to rate any such workers.

Complete the last question only if the worker is no longer on the job.

In making ratings, don't let general impressions or some outstanding trait affect your judgment. Try to forget your personal feelings about the worker. Rate only on the work performed. Here are some more points which might help you:

1. Please read all directions and the rating scale thoroughly before rating.

2. For each question compare your workers with "workers-in-general" in this job. That is, compare your workers with other workers on this job that you have known. This is very important in small plants where there are only a few workers. We want the ratings to be based on the same standard in all the plants.

3. A suggested method is to rate all workers on one question at a time. The questions ask about different abilities of the workers. A worker may be good in one ability and poor in another: for example, a very slow worker may be accurate. So rate all workers on the first question, then rate all workers on the second question, and so on.

4. Practice and experience usually improve a worker's skill. However, one worker with six months' experience may be a better worker than another with six years' experience. Don't rate one worker as poorer than another merely because of a lesser amount of experience.

5. Rate the workers according to the work they have done over a period of several weeks or months. Don't rate just on the basis of one "good" day, or one "bad" day or some single incident. Think in terms of each worker's usual or typical performance.

6. Rate only the abilities listed on the rating sheet. Do not let factors such as cooperativeness, ability to get along with others, promptness and honesty influence your ratings. Although these aspects of a worker are important, they are of no value for this study as a "yardstick" against which to compare aptitude test scores.

MA 7-66
Apr. 1973

NAME OF WORKER (Print) (Last) (First)

SEX: MALE_____ FEMALE_____

Company Job Title: _____

How often do you see this worker in a work situation?

- ☐ All the time.
- ☐ Several times a day.
- ☐ Several times a week.
- ☐ Seldom.

How long have you worked with this worker?

- ☐ Under one month.
- ☐ One to two months.
- ☐ Three to five months.
- ☐ Six months or more.

A. How much can this worker get done? (Worker's ability to make efficient use of time and to work at high speed.) (If it is possible to rate only the quantity of work which a person can do on this job as adequate or inadequate, use #2 to indicate "inadequate" and #4 to indicate "adequate.")

- ☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.
- ☐ 2. Capable of low work output. Can perform at a slow pace.
- ☐ 3. Capable of fair work output. Can perform at an acceptable pace.
- ☐ 4. Capable of high work output. Can perform at a fast pace.
- ☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of work? (Worker's ability to do high-grade work which meets quality standards.)

- ☐ 1. Performance is inferior and almost never meets minimum quality standards.
- ☐ 2. Performance is usually acceptable but somewhat inferior in quality.
- ☐ 3. Performance is acceptable but usually not superior in quality.
- ☐ 4. Performance is usually superior in quality.
- ☐ 5. Performance is almost always of the highest quality.

C. How accurate is the work? (Worker's ability to avoid making mistakes.)

- ☐ 1. Makes very many mistakes. Work needs constant checking.
- ☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.
- ☐ 3. Makes mistakes occasionally. Work needs only normal checking.
- ☐ 4. Makes few mistakes. Work seldom needs checking.
- ☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does the worker know about the job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with the work.)

- ☐ 1. Has very limited knowledge. Does not know enough to do the job adequately.
- ☐ 2. Has little knowledge. Knows enough to get by.
- ☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.
- ☐ 4. Has broad knowledge. Knows enough to do good work.
- ☐ 5. Has complete knowledge. Knows the job thoroughly.

E. How large a variety of job duties can the worker perform efficiently? (Worker's ability to handle several different operations.)

- ☐ 1. Cannot perform different operations adequately.
- ☐ 2. Can perform a limited number of different operations efficiently.
- ☐ 3. Can perform several different operations with reasonable efficiency.
- ☐ 4. Can perform many different operations efficiently.
- ☐ 5. Can perform an unusually large variety of different operations efficiently.

F. Considering all the factors already rated, and only these factors, how good is this worker? (Worker's all-around ability to do the job.)

- ☐ 1. Performance usually not acceptable.
- ☐ 2. Performance somewhat inferior.
- ☐ 3. A fairly proficient worker.
- ☐ 4. Performance usually superior.
- ☐ 5. An unusually competent worker.

Complete the following ONLY if the worker is no longer on the job.

G. What do you think is the reason this person left the job? (It is not necessary to show the official reason if you feel that there is another reason, as this form will not be shown to anybody in the company.)

- ☐ 1. Fired because of inability to do the job.
- ☐ 2. Quit, and I feel that it was because of difficulty doing the job.
- ☐ 3. Fired or laid off for reasons other than ability to do the job (i.e., absenteeism, reduction in force).
- ☐ 4. Quit, and I feel the reason for quitting was not related to ability to do the job.
- ☐ 5. Quit or was promoted or reassigned because the worker had learned the job well and wanted to advance.

RATED BY	TITLE	DATE
COMPANY OR ORGANIZATION	LOCATION (City, State, ZIP Code)	

GPO 883-718

MA 7-66
Apr. 1973

APPENDIX 3

JOB DESCRIPTION

S-11R82

Job Title

CARPENTER (const.) 860.381-022

Guide for Occupational Exploration (GOE) Code 05.05.02 Construction and Maintenance

Job Summary

Follows blueprints, sketches, building plans, and codes to construct and repair structures and fixtures of wood, plywood, wallboard, and other composition material, using carpenter's hand and power tools.

Work Performed

*Plans work and selects necessary materials: Studies blueprints, sketches, building plans, and building codes. Selects and secures lumber and all other materials necessary for construction and installation.

*Prepares layout and cuts and shapes materials: Measures and marks prescribed cutting and assembly lines on materials using ruler, framing square, and calipers, pencil chalk line and marking gauge. Cuts and shapes materials to prescribed measurements using such hand and power tools as saws, chisels, planes, joiners, and routers.

*Assembles and fastens materials into structures or fixtures: Assembles cut and shaped materials and fastens them together with nails, dowels, screws, or adhesive materials. Verifies trueness of structures with plumb bob, carpenter's level, transit, or newer devices such as laser beam.

Covers structure inside and out: Fastens functional and decorative coverings to interior walls, ceilings, roofs, and floors using hand and power hammers, gluing devices, and staplers.

*Applies finish materials to structure: Fits and installs prefabricated window and door frames, doors, weather stripping, and interior and exterior trims. Installs hardware such as locks, drawer pulls, catches, and door stoppers using such hand tools as screwdrivers, brace and bit, and chisel.

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* These job duties were designated as critical job duties because they must be performed competently if the job is to be performed in a satisfactory manner. Carpenters spend about 80% of their working time performing these duties.

* U.S. GOVERNMENT PRINTING OFFICE: 1982 361-270/4949